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Calhoun County Physicians,

Since the Enbridge oil spill on the Kalamazoo River in July 2010, staff at the Calhoun County Public Health Department (CCPHD) have worked with state and federal officials to evaluate the public health risks posed by the spill. As the year draws to an end, we are writing to provide you with an update related to the health and safety of our residents and community. We have found that public health concerns prompted by the Enbridge spill are greatly diminished. Public health officials base this conclusion on the analysis of environmental sampling that has been ongoing since the spill.

- Air sample results collected in the fall of 2010 and again in 2011 indicate that chemical air concentrations have returned to normal background levels.
- Samples of residual oil in soil and river sediments indicate low levels of harmful oil-related chemicals. Dermal irritation could occur, but no long-term health effects are expected should people come into contact with the contaminated soil.
- Drinking water samples from private wells have not shown oil spill-related contamination. Well water sampling will continue for many years.
- Analysis of fish samples collected from the Kalamazoo River in 2010 indicate that the fish have not taken up any oil-spill related contaminants. Additional samples taken in 2011 are undergoing analysis and the current "do not eat" advisory may be revised when all data are available.

These findings indicate that people are not currently at risk from exposure to chemicals released by the oil spill, nor are people expected to be exposed in the future. However, in the days immediately following the spill, people in the surrounding area may have been exposed to harmful chemicals in the air.

- Benzene in the air was found at concentrations that could cause harm to people's health, but people were exposed for only a short time so it is unlikely that anyone will experience long-term health effects from their benzene exposure.
- Other volatile organic chemicals (VOCs) were found in the air, but at concentrations below their health-based screening levels. These VOCs and their odors were likely to have caused some people to experience short-term health effects such as headaches, nausea, respiratory discomfort, eye irritation, and anxiety. Longer-term, more serious health effects are not expected to occur in people who were exposed to these odors.

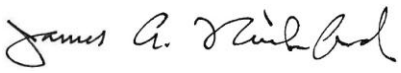
Mid-way through 2011, CCPHD continued to listen to and act upon health concerns expressed by some residents in the county. A question of whether or not to conduct a long-term health study was evaluated in consultation with the Agency for Toxic Substances and Disease Registry (ATSDR) and the Michigan Department of Community Health (MDCH.

After careful examination, the ATSDR determined there are already several public health actions ongoing to evaluate the community's exposure and "a health study would not provide additional, or more specific, information on the community's potential development of health effects." ATSDR also pointed out that these studies are generally not able to determine whether the diagnosis of a specific disease or medical condition for an individual is caused by an exposure, and so are usually of limited value to the individuals who participate in the study. As additional reports are generated from sampling data, ATSDR will determine whether a health study would be justified in the future. Please know that as your Public Health Officer and the community's local resource, I will continue to monitor and evaluate the situation in partnership with other local, state, and federal agencies.

Following is a more detailed update describing the above information, written in conjunction with the Michigan Department of Community Health (MDCH). Additional resources are identified for your information. Also, we want you to be aware that a Guest Column will appear in the Battle Creek Enquirer on January 1, highlighting this information for the general public. A copy of this column will also be posted on our website at www.calhouncountymi.gov/publichealth. As your local public health agency, we will continue to monitor and evaluate the situation in partnership with other local, state, and federal agencies, and keep you informed if any changes occur.

Thank you for your attention to this matter.

Sincerely,



James A. Rutherford, MPA
Health Officer

Public Health Update on the Enbridge Oil Spill
December 2011

It is has been over a year since the Enbridge Oil Spill on the Kalamazoo River (http://epa.gov/enbridgespill/). The release of approximately one million gallons of crude oil has raised many public health questions in our community. The Calhoun County Public Health Department (CCPHD) has worked closely with the federal Agency for Toxic Substances and Disease Registry (ATSDR) and the Michigan Department of Community Health (MDCH) to evaluate potential public health effects of the spill.

People must come into contact with oil-related contaminants (i.e., be exposed) for illness to result from a spill. People could have been exposed to oil-related contaminants by inhaling chemicals released to the air. They could also be exposed if they made direct contact with the oil by touching it or the impacted soil and river sediments. These exposures, particularly by inhalation, may have been significant in the days immediately following the oil spill when chemical contaminant levels were high. However, data gathered in the fall of 2010 through the current date indicate that contaminants have returned to levels that are unlikely to cause human health effects. Sampling prompted by initial concerns about impacts to private wells has demonstrated that people have not been exposed to oil-related chemicals by drinking their well water.

Our investigation continues, however we wanted to describe the actions public health agencies have taken to protect public health and our findings to date.

Inhalation Exposures

Following the oil spill, the U.S. Environmental Protection Agency (EPA) quickly began monitoring the air for volatile organic chemicals (VOCs) and other factors that could be harmful to public health and safety. Initially, handheld "real-time" monitors were used to evaluate total VOCs, hydrogen sulfide, carbon monoxide, percent oxygen, and combustible gas.

- Hydrogen sulfide was not found in the air, oxygen and carbon monoxide levels were normal, and no explosive hazards were found.
- Real-time instruments were also used to measure air levels of the chemical, benzene.
- The EPA chose to monitor benzene because it is the most toxic of the VOCs that could be released from the spilled oil from the Enbridge pipeline.
- Benzene was found in the air at levels that could cause harm to people's health.

Inhaling benzene can cause short-term health effects such as drowsiness, dizziness, headaches, and nausea. These effects stop when a person leaves the area and is able to breathe cleaner air. Longer exposure causes effects on the bone marrow and can cause a decrease in red blood cells leading to anemia. It can also cause excessive bleeding and can affect the immune system, increasing the chance for infection. These health effects are generally reversible once a person is no longer exposed to benzene and health care is provided. Benzene is known to cause leukemia after high exposure, but it takes many years and perhaps decades for this cancer to develop.

As more equipment and resources arrived at the Enbridge spill, air samples were collected in canisters that slowly take in air over 24 hours and then undergo a more sophisticated analysis for a long list of VOCs. Canister samples give a far better understanding of average air concentrations of VOCs that people could be inhaling. Data from the 24-hour samples indicated unsafe levels of benzene in the air near the spill site and along the Talmadge Creek. While other VOCs were found in the canister samples, none of the detected levels exceeded health-based screening levels identified by the health agencies. On July 29, 2010, the high benzene levels prompted CCPHD to recommend that people voluntarily leave their homes until concentrations returned to safe levels. The evacuation recommendation was lifted on August 18, 2010. While benzene was also found in air samples taken from other areas along the affected stretch of the Kalamazoo River, benzene concentrations in these samples did not exceed the health-based screening levels.

People living near the oil spill site and along Talmadge Creek and the Kalamazoo River were likely exposed to benzene by breathing the air. Many people in these areas reported the short-term health effects of benzene listed above. However, since benzene air concentrations returned to safe and then background levels in a matter of weeks after the spill, it is unlikely that anyone will experience more serious, long-term effects associated with exposure to high levels of benzene.

While other VOCs found in the air samples did not exceed health-based screening levels, many people reported that the smell made them ill. Concentrations of VOCs and the accompanying odors were strongest immediately after the spill and most noticeable near the creek and river, particularly near cleanup worksites. The short-term health effects caused by breathing these chemicals are similar to those listed above for benzene and include: headaches, nausea, respiratory discomfort, eye irritation, and anxiety. The MDCH evaluated the prevalence of these effects and documented their findings in the report titled *Acute Health Effects of the Enbridge Oil Spill,* which can be downloaded at*:* http://www.michigan.gov/documents/mdch/enbridge_oil_spill_epi_report_with_cover_11_22_10_339101_7.pdf). Longer-term, more serious health effects are not expected to occur in people who were exposed to the odors caused by the levels of VOCs detected in air samples.

The EPA and contractors working for Enbridge continued to monitor and sample the air until November 2010, when repeated sampling indicated that air concentrations of all oil-related contaminants had returned to background levels. Air monitoring and sampling began again in the spring of 2011 to ensure that the public would not be exposed to unsafe air concentrations as cleanup activities began again. Community locations closest to active worksites were sampled during work activities starting on June 3, 2011. Sampling decreased as the work activities decreased, but does continue to occur around work locations. In addition, real-time monitoring was conducted and 24-hour samples were collected in response to odor complaints from residents. These data indicate that concentrations of oil-related contaminants have returned to background levels throughout the areas affected by the oil spill.

Direct Contact

Immediately after the oil spill, Calhoun and Kalamazoo counties, as well as the MDCH, issued public advisories that recommended people keep away from the spill area and avoid all contact with the oil. At that time, chemical levels in the oil were likely very high and could have caused

dermal and ocular irritation if people got it on their skin or in their eyes. Calhoun and Kalamazoo counties also closed the affected stretches of the river to all recreational activities as a precaution to protect public health and safety.

In the spring of 2011, samples of the weathered oil that remained in the Kalamazoo River sediments and upland soils were analyzed for VOCs and other oil-related chemicals. The MDCH evaluated the risk of exposure through direct contact with these sediments and soils, which could result in dermal absorption and accidental ingestion. The MDCH concluded that the levels of chemicals remaining in the weathered oil pose no long-term health risks to people who regularly use the river. However, it is possible that some people could experience dermal irritation if they get the weathered oil on their skin. The MDCH continues to advise the public to avoid contact with the oil. Skin or clothing that comes into contact with the oil should be washed with soap and water. The MDCH report can be downloaded at: http://www.michigan.gov/mdch/0,4612,7-132-54783_54784_56159-263152--,00.html.

Continuous sampling of the Kalamazoo River water indicates no oil-related chemicals remain in the surface water. However, the river remains closed due to concerns for public safety as a result of the on-going cleanup activities and resultant heavy boat traffic.

Ingestion of Drinking Water

The CCPHD issued a precautionary Bottled Water Advisory on July 29, 2010. At the time of the advisory, there was no evidence to suggest that groundwater contamination had occurred from the oil spill. However, the advisory was issued as a precaution and to allow time for well water samples to be collected and analyzed. The Bottled Water Advisory was lifted on November 8, 2010.

Sampling of private drinking water wells has been on-going since the first week of the response to the Enbridge oil spill. Samples have been analyzed for both oil-related chemicals and for non-oil-related chemicals, such as arsenic and lead. More than 150 wells have been sampled: first every other week, then less often as the results indicated no impacts from the oil spill. Samples are now taken quarterly. The MDCH has evaluated these data and will shortly release of report of their findings. In summary, only two oil-related inorganic chemicals, nickel and iron, were found in private drinking water wells. Nickel and iron are naturally occurring in wells in Calhoun County. The levels of nickel and iron found were above health-based screening levels in some private wells, but the amounts present are not expected to be harmful. No oil-related organic chemicals were found in the wells. However, some wells contained elevated levels of arsenic and lead. While these contaminants are not a result of the Enbridge oil spill, people drinking this water could experience adverse health effects and may want to install a home water treatment system.

Fish Consumption

MDCH continues to recommend that people not eat fish from Talmadge Creek or from the Kalamazoo River between I-69 and Morrow Dam. Data from fish samples collected in 2010 after the spill did not show any impacts from the oil. When additional data from samples collected in 2011 are available, the fish consumption advisory will be updated.